

Revascularization of a Non-Vital Immature Tooth: A Case Report

Pinky Chaurasia^{1*} Kiran K² GV Babu³ Aradhana Agrawal⁴ Rana K Varghese⁵ Smitha Priyadarshini⁶

¹Post Graduate Student, Department of Pedodontics & Preventive Dentistry, New Horizon Dental College & Research Institute, Bilaspur, India.

²Professor and Head, Department of Pedodontics & Preventive Dentistry, New Horizon Dental College & Research Institute, Bilaspur, India.

³Professor, Department of Pedodontics & Preventive Dentistry, New Horizon Dental College & Research Institute, Bilaspur, India.

⁴Reader, Department of Pedodontics & Preventive Dentistry, New Horizon Dental College & Research Institute, Bilaspur, India.

⁵Dean, Professor and Head, Department of Endodontics, New Horizon Dental College & Research Institute, Bilaspur, India.

⁶Reader, Department of Oral Medicine and Radiology, Institute of Dental Sciences, Bhubaneswar, Odisha, India.

ABSTRACT

Background: The purpose of this report was to present the case of a patient where in revascularization of the necrotic infected pulp space of an immature permanent maxillary right central incisor (11) tooth was induced in vivo by stimulation of a blood clot from the periapical tissues into the canal space. This was achieved after disinfection of the canal space with a topical antibiotic paste followed by a blood clot scaffold induced from the periapical tissues. Revascularization is a treatment procedure that promotes the apexogenesis in a necrotic immature permanent tooth. This procedure can be considered as a promising approach over traditional methods.

Keywords: Revascularization, immature tooth, apexogenesis.

INTRODUCTION

Pulpal necrosis of an immature tooth secondary to caries or trauma poses many potential complications. The traditional techniques of disinfection and biomechanical instrumentation of the root canal system used in mature teeth are limited by the anatomy of the immature tooth.¹ It is difficult to instrument immature root canal with conventional endodontic techniques. Because of the open apex root canal is difficult to seal with conventional root filling methods.² Research involving revascularization procedures has been developed in 1950's and 1960's. The aim was to revascularize the immature teeth with ischemic pulp tissue following injury.³

In 1961, Ostby gives the importance of the blood clot in the periapical healing of teeth with empty root canals.³ There are some studies which shows that traumatic injuries to immature teeth shows promising result in revascularization of the root canal system.¹

CASE REPORT

A 15 year old girl was referred to the Department of Pedodontics and Preventive Dentistry, New Horizon Dental College And Research Institute, Sakri, Bilaspur for the management of a non-vital tooth with open apex. According to the patient's clinical record, she had experienced pain in her upper right front teeth region since 1 year. Patient suffered a trauma to her teeth 5 years back. Intraoral examination revealed the presence of sinus tract opening which is round in shape about 5mm in size with small pinpoint opening in relation with 11. The intraoral periapical radiograph revealed 11, 12, 21 and 22. 11 showing periapical radiolucency with open apex, radiolucency extended upto 12. In the first appointment, access opening and working length determination done with 11. 1% NaOCl (Prime Dental, India) was used for irrigation and no endodontic instruments were used. The canal was dried with paper points and a 3 mix antibiotic paste (Minocycline, Ciprofloxacin and

Received: Nov. 6, 2017; Accepted: Dec. 24, 2017

*Correspondence Dr. Pinky Chaurasia.

Department of Pedodontics & Preventive Dentistry, New Horizon Dental College & Research Institute, Bilaspur, India.

Email: satishrchaursiya@gmail.com



Fig 1: Pretreatment: periapical lesion with 11 extended upto 12.

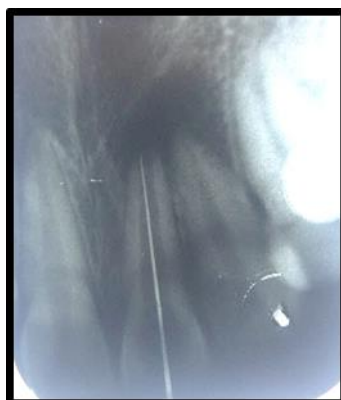


Fig 2: Working length determination with 11.



Fig 3: Treatment by revascularization with 11.

Metronidazole) in 1:1:1 concentration was placed using propylene glycol as vehicle.

The orifice was plugged with a sterile cotton pellet and access sealed with resin modified glass ionomer cement (Fuji II LC, Japan). After 3 weeks, patient returned with no further complaint of pain or any

sort of discomfort. The tooth was re-entered with a sterile # 10 file (Mani, Japan) and was used to

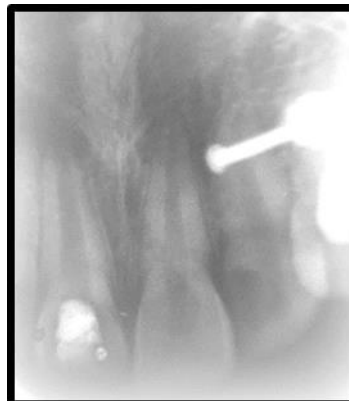


Fig 4: Follow up after 1 month showing progressive healing of periapical region.



Fig 5: Follow up after 6 month showing healing of periapical region along with bone formation and thickening of dentinal tubules 11.



Fig 6: Follow up after 12 month showing healing along with apex closure with 11

induce bleeding by instrumenting the periapical area in excess of the working length noted in the previous clinical records that is by 2 mm. When bleeding was noticed in the canal, a small, moist cotton pellet was used to plug the canal about 2-3 mm below orifice and restrict the clot formation. Blood clot was allowed to form for 15 minutes in the canal and then absorbant was placed with cemento-enamel junction. The canal was sealed with triple barrier in the form of absorbant, GIC and Composite resin (Ceram.X duo, Dentsply, UK). During 3 months follow up, the tooth became discolored but the radiographic evidence of apexogenesis was evident.

DISCUSSION

Revascularization is a type of treatment which provide a favorable alternative to apexogenesis by the development of a longer and thicker root, which is less susceptible to fracture and possibility of gaining vitality. The factors that need to be considered for successful revascularization procedure are: the viability of the remaining survived pulp tissue and the stem cells of the apical papilla. So an important protocol of 'no canal instrumentation' in the revascularization procedure should be followed to preserve essential stem cells.⁴ In this present study, for the sterilization of infected root dentin, combination of 3 Mix antibiotic paste was used (ciprofloxacin, metronidazole, and minocycline). It was an effective disinfectant and been successfully used in regenerative endodontics.⁵ Vehicle used was Propylene glycol because of its potential for rapid and effective delivery of intracanal medicaments into root dentin.⁵

Apart from disinfection, for cell growth and differentiation, an appropriate scaffold is needed. Inducing blood clot within the root canal is considered a scaffold as well as a source of growth factors such as platelet derived growth factor, vascular endothelial growth factor, platelet derived epithelial growth factor, tissue growth factor which stimulate differentiation, growth and maturation of fibroblast, odontoblasts, cementoblasts etc. These growth factors will facilitate the repair and regeneration of tissues into the canal.⁶ Long-term sealing is ensured by placing triple seal of ABF gel

followed by GIC and Composite resin.⁴ A 12 to 18 month recall should be considered the earliest time point to conduct clinical examination.⁶

CONCLUSION

The outcome of this case report suggested that the conservative treatment approach can create a suitable environment for pulp regeneration and result in root maturation via regaining the vitality of the tooth. This leads to an added advantage of increased strength of the tooth, with lesser financial burden as well as better psychological well-being to the patient.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES

1. Thibodeau B, Trope M. Pulp Revascularization of a Necrotic Infected Immature Permanent Tooth: Case Report and Review of the Literature Pediatric Dentistry. 2007; 29:1.
2. Andreasen JO, Farik B, Munksgaard EC. Long-term calcium hydroxide as a root canal dressing may increase risk of root fracture. Dent Traumatol 2002;18:134-7.
3. Albuquerque, Nagata J, Soares AJ, zaia A A. Pulp revascularization: An alternative treatment to the apexification of immature teeth. RGO. Rev gaúch odontol, porto alegre. 2014;62:4;401-410.
4. Rai A, Ghiraiya U. A Case Report on Revascularization of a Non-vital Immature Tooth. International Journal of Dental Sciences and Research. 2014;2:5:5-7.
5. Takushige T, Cruz EV, Asgor Moral A & Hoshino E. Endodontic treatment of primary teeth using a combination of antibacterial drugs. International endodontic journal. 2004;37;132-138.
6. Udhyia J, Varadharaja M M. Revascularization of dental pulp- contemporary review. International journal of research in dentistry. 2013; 3:6.

